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Lecture times: Section 4132

Tuesday, 2:30 pm - 3:20 pm (GY522)

Thursday, 2:30 pm - 3:20 pm (GY522)

Laboratory times:

4133 Thursday, 3:35 pm - 5:30 pm (GY522)

13922 Thursday, 5:35 pm - 7:40 pm (GY4522)

Rationale and Objectives

GEOL G111 – Physical Geology is an introductory science course intended for university students with a strong science background and for those intending to be majors within the Geological Sciences. G111 is designed to provide students with a more in-depth exploration of the physical processes that are active on the surface and within the Earth. Lectures and laboratories will focus on the interactive nature of chemical and physical processes that have shaped the Earth during the past 4.5 billion years.

Instruction will consist of two 55-minute lectures and one 115-minute laboratory per week. Quizzes and in-class exercises will be conducted on an as-appropriate schedule and will not be excused. All labs are set-up as projects that have individual objectives; the format will contain aspects that require the student to work within a problem-solving format. All labs require a final analysis and the submission of a final set of materials and/or a report; lab participation as well as the written materials submitted at the end of each lab will constitute the basis of the laboratory grade. There are no make-up laboratory meetings. Each student is allowed to drop the grade from one laboratory exercise; completion of all laboratory exercises will be applied as extra credit.

Logistics and Attendance

Topics in lecture and laboratory build from fundamental concepts at the beginning of the semester to complex interdisciplinary concepts later in the semester. Attendance in lecture and is necessary both for your performance as an individual and for your contribution to group activities in lecture and laboratory. Students are expected to read the assigned pages prior to lecture and to be prepared for discussion and exercises based on their reading. Concepts and terms necessary to understand the laboratory exercises are presented during the lecture. Lab instructors do not have time to remedially cover concepts for students who miss lecture. In order to ensure the quality of this course for all students, unannounced quizzes and graded exercises are given in lecture. Some of the quizzes and in-class exercises will be conducted in small groups.

Grading

Final grades will be based on: quizzes, homework, and in-class exercises (5%); two 50-minute lecture examinations (40%, 20% for each exam); laboratory work (35%); and a comprehensive final exam (20%). All work in G111 must be conducted in adherence to the academic code of conduct, as stated in *The Code of Student Rights, Responsibilities, and Conduct*. Copyright 1998, The Trustees of Indiana University.

Accountability

My responsibility as the instructor is to provide a cogent and relevant college course. I will incorporate numerous practical examples and discussions of how the foundation we will be laying will be used as you move through your academic career and beyond. Your responsibility as a student is to be intellectually engaged with the course and to participate fully in the in class experiences and laboratory exercises.

Texts

The text selected provides a well written, engaging presentation of the material. Additional reading and alternative presentations may be found in the supplementary text listed below. These will be placed on reserve in the Geology Library. Additional links to web sites will also be given in class.

Required text:

Marshak, Stephen, 2013. Essentials of Geology (4th Edition), W.W. Norton & Company, New York, NY.

Supplementary texts:

Grotzinger, John and Jordan, Tom, 2010. Understanding Earth (Sixth Edition), W.H. Freeman and Company, New York, NY, 654pp.

Rogers, Nick, 2008. An Introduction to Our Dynamic Planet, Cambridge University Press, New York, NY, 390pp.

Weekly Schedule (subject to future revision)

The following weekly schedule is intended to provide a general overview. A laboratory schedule is also provided. The overall scheduling of topics will be followed as presented, but details may be altered as the course progresses. Laboratory material will complement the lecture material and serve to provide an opportunity for the students to investigate detailed aspects of the lecture material. Laboratory materials will be posted in CANVAS and must be printed and brought to each of the laboratory meetings during the semester.

Aug. 25, 27	Lectures: General overview + course policy; Geology and the Scientific Method; Earth Systems; Plate Tectonics Reading: <i>Essentials of Geology</i> p. 1-21, 35-69 Laboratory 1: Topographic and geologic maps
Sept. 1, 3	Lectures: Plate Tectonics Reading: <i>Essentials of Geology</i> p. 1-21, 35-69 Laboratory 2: Plate Tectonics
Sept. 8, 10	Lectures: Minerals Reading: <i>Essentials of Geology</i> p. 71-87 Laboratory 3: Minerals
Sept. 15, 17	Lectures: Rock Groups; Igneous rocks; Volcanic Processes and Hazards Reading: <i>Essentials of Geology</i> p. 89-95, 97-117, 119-147 Laboratory 4: Igneous rocks and the processes of their formation
Sept. 22, 24	Lectures: Sedimentary rocks; Surface processes Reading: <i>Essentials of Geology</i> p. 148-161, 163-187 Laboratory 5: Sedimentary processes and the deposition of sedimentary rocks
Sept. 29, Oct. 1	Lecture: Review, FIRST LECTURE EXAM (Oct. 1) Reading: <i>Essentials of Geology</i> Chapters 1- 6 NO Laboratory this week
Oct. 6, 8	Lectures: Metamorphism; Control of metamorphic conditions; Rock Cycle Reading: <i>Essentials of Geology</i> p. 189-209, 210-215 Laboratory 6: Properties of metamorphic rocks
Oct. 13, 15	Lectures: Earthquakes; Plate tectonic settings of earthquakes; Interior of the Earth Reading: <i>Essentials of Geology</i> p. 217-251, 252-263 Laboratory 7: Earthquake mechanisms and locations
Oct. 20, 22	Lecture: Rock deformation; Folding and fracturing of rock Reading: <i>Essentials of Geology</i> p. 265-291 Laboratory 8: Making mountains

Oct. 27, 29	Lectures: Geologic time; absolute and relative ages Reading: <i>Essentials of Geology</i> p. 292-303, 305-327 Laboratory 9: Setting the clock for the history of the Earth
Nov. 3, 5	Lectures: Review; SECOND LECTURE EXAM (Nov. 5) Reading: <i>Essentials of Geology</i> Chapters 7-10 NO Laboratory this week
Nov. 10, 12	Lectures: Earth's Surface; Streams; Stream transport of sediments Reading: <i>Essentials of Geology</i> p. 386-395, 417-445 Laboratory 10: Stream processes and flooding
Nov. 17, 19	Lectures: Groundwater Reading: <i>Essentials of Geology</i> p. 473-495 Laboratory 11: Groundwater flow
Nov. 23 -37	No classes this week – Thanksgiving Break
Dec. 1, 3	Lectures: Oceans; Deserts; Glaciers Reading: <i>Essentials of Geology</i> p. 445-471, 497-513, 515-543 Laboratory 12: Interpreting the surface of the Earth
Dec. 8, 10	Lectures: Energy and Mineral resources Reading: <i>Essentials of Geology</i> p353-385 Laboratory 13: Extracting resources from the Earth
Dec. 15	FINAL EXAMINATION GEOL G111 Section 4132 Tuesday 12:30 PM – 2:30 PM GY 522